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May 20, 1957

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Subject: Request for Proposal, CB-3 and CB-4 Units

Reference: Specification #57-A-1059-A, "Development Specifications for a Miniaturized Data Recorder with Playback Unit", dated 4 February

Gentlemen:

In response to your letter of March 21, 1957 regarding the above, a technical meeting was attended by the undersigned and with members of your facility approximately three weeks ago. Since this meeting we have proceeded in the analysis of a suitable engineering approach to the desired requirements.

Enclosed, herewith, please find two (2) copies of our Technical Proposal, four (4) copies of Form DD-633 cost analysis, and two (2) copies of Itemized Cost Breakdown which we feel would be of further assistance. All costs are in compatibility with the conditions of our present Master Task CPFF Contract.

As further requested by you, we are returning all enclosures as originally received and as listed below:

1 copy - Spec. No. 57-A-1059-A
1 copy - Attachment A
1 copy - Security Requests for Contractors
1 copy - Security Agreement Form
2 copies - Secrecy Agreement
1 copy - Procedure for Mailing Classified Material
2 copies - Original letter dated 21 March 1957.

(Cont'd.)

[redacted] CONFIDENTIAL ~~SECRET~~ 25X1

We also wish to confirm our understanding of the security requirements related to this discussion and procurement, and wish to assure you that all security aspects have been fully maintained and adhered to.

If further details relating to this proposal may be desired, please feel free to contact the undersigned at your convenience.

May we express, as well, our appreciation for the privilidge of submitting our proposal and trust that you find it acceptable.

Sincerely yours,

[redacted] 25X1

HRG:aw
Encl.

~~SECRET~~ CONFIDENTIAL

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[redacted]

TO [redacted] May 20, 1957 25X1

RE: MATERIAL RECEIPT

ORIGINAL to be signed personally by the recipient and returned to sender.
DUPLICATE to be retained by the recipient addressed.
TRIPLICATE to be retained by sender for suspense file.

I have personally received from [redacted] the material identified below. In the event that such material is CLASSIFIED, I assume full responsibility for the handling, storage and transmittal elsewhere of these documents in accordance with existing regulations governing the handling of CLASSFIED material. 25X1

The CLASSIFIED material, including enclosures and attachments, is identified below. (In identifying CLASSIFIED material, avoid any reference which might cause the receipt form to become CLASSIFIED.)

IDENTIFICATION OF MATERIAL

Proposal on Miniaturized CB-3 Recorder and Playback Unit

One (1) Original
One (1) Carbon

1 copy - Spec. #57-A-1059-A
1 " - Attachment A
1 " - Security Requests for Contractors
1 " - Security Agreement Form
2 " - Secrecy Agreement
1 " - Procedures for Mailing Classified Material
2 " - Original letter dated 21 March, 1957
2 " - [redacted] dated 20 May, 1957 25X1

CONFIDENTIAL

Date

~~SECRET~~

Signature

Title

PROPOSAL
for
MINIATURIZED DATA RECORDER
and
PLAYBACK UNIT

PREFACE

This technical proposal has been prepared subsequent to a rather comprehensive engineering and design analysis despite the short time allowed for its submission. It is felt that in this time an adequate survey of the state of the art was obtained in our effort to comprehend the feasibility of the Development Specification # 57-A-1059-A.

As has been our normal practice, we have presented here what we feel is a conservative and hence realistic approach. We sincerely trust that an appropriate engineering effort would significantly assist in deriving both the techniques and designs required to satisfy the stated requirements.

Pertinent problem areas have been explored and where possible described in terms of possible trade-offs so as to preserve the important performance factors. Discussions have been initiated with various motor battery and recording head manufacturers and while no finalization of these discussions are possible at this early time, we feel that further coordination of this type will result in a usable end item.

The art of miniaturization is of course, heavily manifest in our Company. Every assistance required for such purposes has been assured. We contemplate only limited tooling for fabrication of such devices whereby complete interchangeability of sub-assemblies may be assured for this, or repeat small quantities.

In view of the magnitude of this task and the obvious need for close coordination, it has been assumed that each work area, as described by Item, shall be subject to customer approval prior to proceeding with the following phase. Obviously, in the successful performance of this work, subsequent work areas may more easily be utilized to confirm the costs presently submitted. This too, it is felt, would be desirable for this program.

MINIATURIZED DATA RECORDER

AND

PLAYBACK UNIT

I. INTRODUCTION

This proposal has been prepared in response to a request for quotation on the development of "A Miniaturized Data Recorder with Playback Unit" in accordance with the requirements of Specification No. 57-A-1059-A and describes the method of attack which we believe would result in successful completion of the required task.

II. GENERAL

A close study of the specifications leads to the conclusion that many of the requirements are well beyond the performance capabilities of currently available equipment if not, indeed, beyond the present state of the art. Bearing this in mind, we propose that the development of the engineering model (Item 1 of Attachment "A") be preceded by the construction of a breadboard study unit which would permit the evaluation of the several new components which we feel will be required. In order to provide for this kind of study, it is suggested that Item 1 might be conveniently split into two phases, Phase I covering the breadboard and Phase II the engineering model.

The major problems presented by the specifications appear to be the following:

a. Those arising from the necessity for recording three parallel tracks on 1/4 inch tape with the required frequency and trans-

ient response and for the specified recording time.

b. Those resulting from the stability requirement for the reference oscillator in the recorder.

c. Those associated with the necessity for low drain, low noise, well governed transport motors.

d. Those connected with the temperature and shock resistance requirements.

e. Those arising from the need for miniaturization of the complete recorder with consequent need for extreme miniaturization of the required components.

f. Those pertaining to battery life.

The other problems imposed by the specifications for the recorder do not appear unusual and with the application of sufficient design ingenuity should be readily solved. Consequently, the detailed discussion of this proposal will not deal with these lesser items except insofar as they may be related to the difficulties of ultra-miniaturization.

The development of the required playback unit does not seem particularly difficult and, therefore, discussion will be limited to the methods we propose for speed control and for use with the variety of power sources specified.

III. DETAILED DISCUSSION

3.1 Response and Recording Time - The frequency response and the transient response of a tape recorder and playback are directly related to the tape transport velocity and to the recording head gap. In general, the higher

the tape speed and the smaller the gap length, the better the response. It is obvious, however, that the requirement for miniaturization coupled with a recording time of 60 minutes does not permit a high tape velocity. For a tape speed of 2.4 inch/sec. and a recording time of 60 minutes, 725 feet of tape are required. Using the thinnest commercially available tape (.0006 inch thick), this length of tape can be wound on a spool approximately 2-5/8 inch outside diameter. Now, short of resorting to displacement type cartridges or stacked spools with a consequent difficult drive problem (to be discussed later) this appears to be the largest spool size which can be accommodated in the available space.

Now the difficulty with these figures stems from the fact that a tape speed of 2 inch/sec. is too low for the specified frequency response. In fact, even if a head were designed which would provide the necessary fidelity for sinusoidal waves, it appears doubtful, at this time, whether transient pulses of 5 microsecond duration could be discerned from noise. (Assuming that the response would drop off at the rate of 6 db/octave above say 5 KC and considering the fundamental of the square pulse as 200 KC, the response would be down approx. 35 db). Naturally, this problem would be fully explored and we propose to utilize the experience and services of those companies currently developing recording heads. Should the above analysis prove correct, however, we propose to increase

the tape speed at the expense of recording time to the point where the desired fidelity for sinusoidal signals is attained. Further, should this higher tape speed still prove insufficient for the recording of pulses, we propose to incorporate means within the recorder for expanding the incoming pulse signal to something less than the normal repetition period. This could be done, for instance, by means of a multivibrator which when triggered by the input pulse produces a secondary pulse of sufficient duration for adequate recording. Assuming that the minimum period between incoming pulses is many times greater than the pulse width, this method could significantly improve the response of the recorder to transient signals. The expanded pulse can be reproduced by the playback unit as is, or if this is undesirable, it can be restored to its original length by circuitry within the playback amplifier.

Insofar as the rest of the recording electronics are concerned, we propose to utilize printed circuit techniques and transistor circuitry. As a rough estimate at this time, it appears that recording of the three channels will require 2 or 3 transistors for each preamplifier plus 1 or 2 transistors for the required bias oscillator, common to all channels. In addition, the reference oscillator which is discussed elsewhere in this proposal will require at least 1 transistor. Thus it can be seen that somewhere between 8 and 12 transistors plus associated circuitry will be required. Every attempt will be made to unitize the electronics, but in the interest of most efficient utilization of space, it may be necessary to distribute the circuitry in 2 or 3 packages.

3.2 Reference Oscillator - The specifications for a 1000 cycle reference oscillator to be incorporated in the recorder require a stability of plus or minus one part in 50,000 over the temperature range of plus 50° C through minus 30° C. The only satisfactory way of maintaining stability of this order is with a crystal controlled oscillator. Previous experience by this company with problems of this type indicate that without the use of any compensation device, even a crystal controlled oscillator would probably drift about 3 parts in 50,000. To improve on this performance, one of two methods are proposed. It is possible to enclose the crystal in a thermostatically controlled oven or it may be possible to use an oscillator circuit in which a capacitor with the proper temperature coefficient connected in series with the crystal compensates for changes in the crystal. Of the two methods, the former is a proven one and naturally offers assured success while the performance of the latter is not known at this time and would require study. The difficulty with the oven solution is that it requires an increase in size of an already large crystal can (estimated at 2-1/2" X 3/4" X 3/8" without heater or thermostat) and of course it implies a continuous drain on the batteries. One possible way out of this difficulty is to house the oscillator with its own power pack as a separate unit connected via a cable to the recorder proper. The additional space which this scheme would provide in the recorder could be put to good use and would considerably simplify the overall packaging problem. Another possibility would be to increase the frequency of the oscillator and consequently reduce the required size

of crystal. For instance, it is estimated that a frequency of 5000 cycles would require a crystal only 1-1/2 inch long as compared with 2-1/2 inch for 1000 cycles.

Should the 1000 cycle tone be required for reasons unknown to us, we would, of course, make every effort to incorporate it within the recorder and we merely offer the idea of a separate package at this time as an alternate scheme which could be used if absolutely necessary.

3.3 Recorder Drive Motor - The requirements for the recorder drive motors are particularly stringent and preliminary study on our part has not uncovered any commercially available motors which would be suitable. In order to develop the required torque from a miniature motor, the use of a high speed and appropriate gearhead is indicated. Unfortunately, the high speed motors studied up to now are excessively noisy for the present purpose. Also, available low voltage motors draw rather high currents. As a consequence of these observations, we propose to develop a motor especially suited to our purpose. In the design of such a motor emphasis would be put on low noise level, magnetic shielding, and high efficiency. This company has had considerable experience in the design of special small motors and the services of the personnel connected with this work would be available to our division.

3.4 Environmental Conditions - The various operating and storage conditions stated in the specifications are worthy of serious consideration. The operating temperature range excluding internal batteries is within the realm of prior experience, but the requirement for non-injurious storage

of the batteries within the range of plus 60°C to minus 60°C appears to be more a matter of battery design than equipment design. In view of the necessity for using standard batteries, the possibility of developing special cells is ruled out and the available cells may not meet the requirements. It is possible to protect the batteries with thermal insulation, but the sacrifice of usable space does not seem expedient. In any event, this problem would be studied further during Phase I.

Insofar as the shock and vibration resistance of the recorder is concerned, it is felt that the unit must, of course, be rugged enough to withstand normal usage, but the drop test requirement implies a ruggedness which could only be attained at the expense of lightness and compactness. Our concern in this regard is not over the electronics which would be completely potted, but rather for the mechanism and case which must be light and small. All sensitive elements would be suitably shock mounted within the limits of available space, but the severe shock resulting from a drop test appears excessive.

The water resistance and orientation requirements do not present any difficulties and should be easily met.

3.5 Battery Life - Quite apart from the storage temperature problem discussed above, the requirement for extended battery life within the temperature range of 0° C to plus 50° C is important enough to warrant separate discussion. The current drain from the electronics battery is conservatively estimated at between 200 and 300 ma. Assuming that a battery such as the Type RM-12R is used, the best life expectancy would be about 15 hours.

With two such cells the life could be doubled, but even this would fall short of the desired duty. What the effect of prior storage at low temperature would be on these estimates is unknown at present and would have to be investigated.

The situation for the transport battery is very much the same since the estimated drain on this battery is about 400 to 500 ma. and the estimated expectancy from batteries small enough for the purpose is 7 to 10 hours.

As will be shown later in this report, the main factor to be considered in evaluating this estimate of battery life is the available space. There is no doubt that the desired life could be attained from available batteries, but as can be seen from the drawings accompanying this proposal, the maximum space which can be allotted for batteries is insufficient for these larger sizes. Final design may improve on these estimates, but at this time we feel that conservative analysis is indicated.

3.6 Mechanical Configuration - The mechanical configurations which we propose are shown on the drawings herewith and these will be described. Before this is done, however, it might be instructive to compare the available volume with the sum of the volumes of the individual elements.

Total Volume = 3X5X1.5 = 22.5 Cubic Inches

Estimated Component Sizes

Components	Volume
(2) Spools (2.625d X 0.312X2) = (5.412 X 0.624)	3.377
(1) Case X Cover (Aug. 0.100") (3X5X0.2) +	
(1.3X5X0.2) + (2.8X1.3X0.2) =	5.028
(1) Record Head (0.4 X .7 X .7)	0.196
(1) Motor (.875d X 1.25) = (0.602 X 1.25) =	0.753
(4) Batteries (+ Compartments) (1.625X0.875X1.900)	3.088
Controls (0.850 X 1 X 3.00)	2.550
Amplifier (2 X 2.8 X 0.7)	3.920
Transport Baseplate (0.060 X 2.8 X 4.8)	0.806
(1) Tape Drive (Flywheel, shafts, etc.)	0.500
(1) Microphone Int.	1.000
(1) Oscillator (crystal + circuitry)	3.000
(1) Motor Governor	0.300
(1) Motor Filter	0.500
Total	24.018

As can be seen, the total of the estimated sizes of the elements without any provision for air spaces already exceeds the total available volume. These estimates are based on available components and we propose to develop suitably small substitutes for these. It appears quite likely that we can effect an average reduction of 25% and, therefore, accomplish the desired result. Some compromises may have to be made but the designs we propose are based on a best effort attempt to meet all the requirements and we believe, are completely feasible.

Fig. 1 shows one possible arrangement for the recorder. The various components would be located as indicated and the tape speed would be controlled by the driven capstan located on the pivoted capstan arm. The take-up reel would be driven through a slip clutch so that the tape is always tight, but the tension would be such that the tape could not slip past the capstan. The internal microphone would be mounted in a dovetail groove mount which would permit ready removal and reinsertion in an inverted position when necessary for water protection.

Another possible configuration is shown in Fig. 2. In this scheme the sides of the case are bowed to permit more efficient use of the space. The entire tape deck is exposed when the top cover, which is removable by virtue of the slip hinges, is taken off. The motor drive and mechanism would be located in the case as shown. A simple drag would be provided on the supply reel and in addition a brake which is mechanically linked to the ON-OFF switching arrangement could be incorporated if found necessary. The batteries would be accessible for ready replacement. All the controls

except the selector switch would be recessed and made as large as possible. Upon the insertion of a plug for any of the remote functions, the corresponding internal functions would be automatically disconnected. The physical appearance of the unit would be consonant with its use and would encourage careful handling as an instrument.

A third possible method is shown in Fig. 3. In this construction, the supply and take-up reels are stacked vertically. As can be seen, this permits the use of somewhat larger reels. The tape would be driven by a capstan and pressure roller combination and would be shifted vertically by a skewed roller and then wound up on the take-up reel. The other features are essentially the same as in the first two methods except for distribution.

Fig. 4 depicts an alternate proposal similar to the second. In this design, the entire tape deck is located in the top cover which again would be removable. The recording head is located in the case and guide rollers in the cover impart the necessary twist to the tape; closure of the cover would ensure the required contact with the head. The motor drive would also be in the case and would automatically couple with the connecting drive in the tape deck. If desired, the entire deck can be used as a cartridge for the rewind and playback functions, thus simplifying handling of loose reels. Furthermore, additional decks could be provided for rapid and easy loading under field conditions.

The material used for the main body and top cover of the recorder could be a suitable aluminum or magnesium alloy as required or it could

be one of the newer high impact plastics. With proper ribbing, the plastic case could be made extremely rugged. The mold costs would be quite high, but in the event of a mass production requirement, this cost would be quickly absorbed.

IV. PLAYBACK UNIT

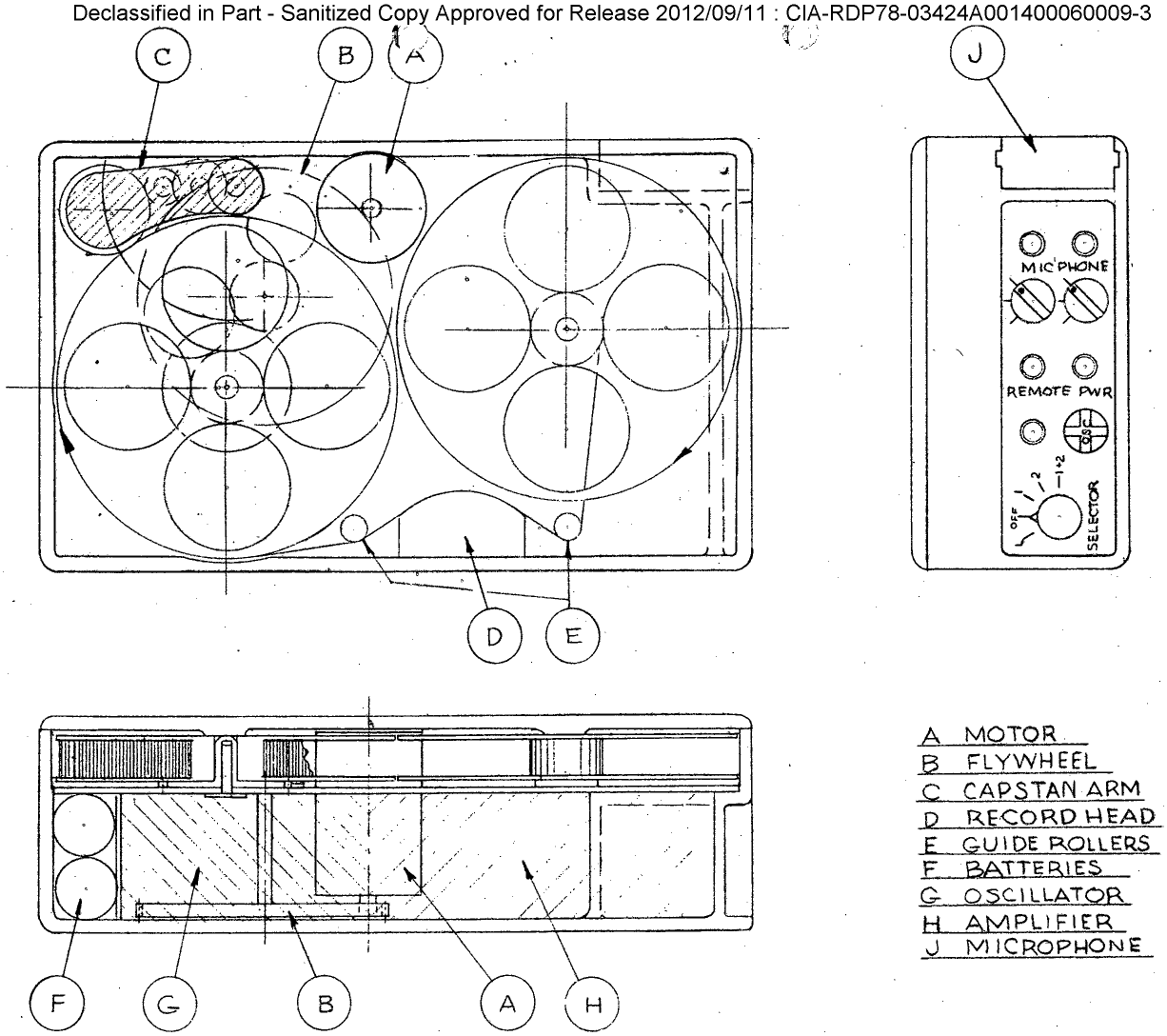
The playback unit would incorporate rapid rewind and forward features as well as normal playback function. Means would be provided for monitoring any combination of outputs and desired and all the other requirements for indicators and gain controls would be satisfied. The indication of speed could be accomplished by beating the two frequencies (tape and playback oscillator), and after appropriate rectification and integration, the resultant DC voltage could be displayed on a center-zero type of null meter. Other methods resulting in display on a cathode ray tube could be developed and since the techniques involved are well known, they need not be discussed now.

The playback unit would be designed to operate from any of the power sources specified. One way to do this would be to rectify the input and clip the DC so that the output voltage is constant regardless of original input. This DC voltage would be used to drive the playback motor and by means of a tachometer feedback servo the speed of the motor could be accurately controlled. Manual variation of the motor speed and hence of the tape speed would be easily accomplished by this method.

The entire playback unit would be packaged to fit in a standard 19 inch rack; all controls would be mounted on a front panel for ease of control.

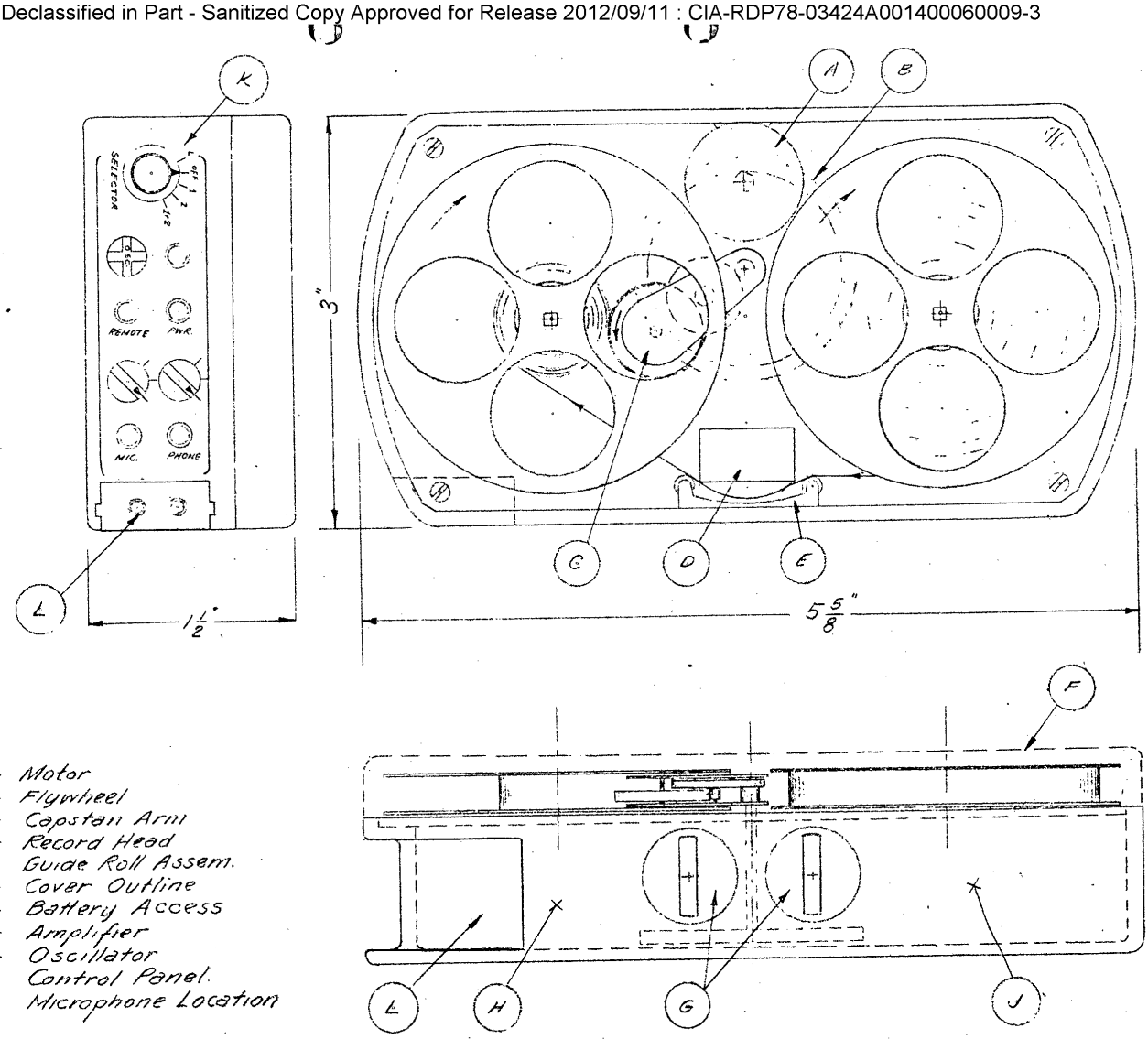
V. SUMMARY

The above report describes the approach which we would follow in the development of a CB-3 data recorder and CB-4 playback unit. The problems which have been explored are admittedly difficult, but we feel that the experience and background of this company in the field of miniaturization of precise mechanisms and electronics would lead to successful solutions. Should we be awarded a contract to perform this work, we would maintain the necessary liaison with the cognizant customer personnel to ensure that the intent as well as the letter of the requirements are met. Undoubtedly, some variations of the specifications as they now stand will have to be mutually worked out, but we shall stint no effort to provide equipment as desired.



A MOTOR
B FLYWHEEL
C CAPSTAN ARM
D RECORD HEAD
E GUIDE ROLLERS
F BATTERIES
G OSCILLATOR
H AMPLIFIER
J MICROPHONE

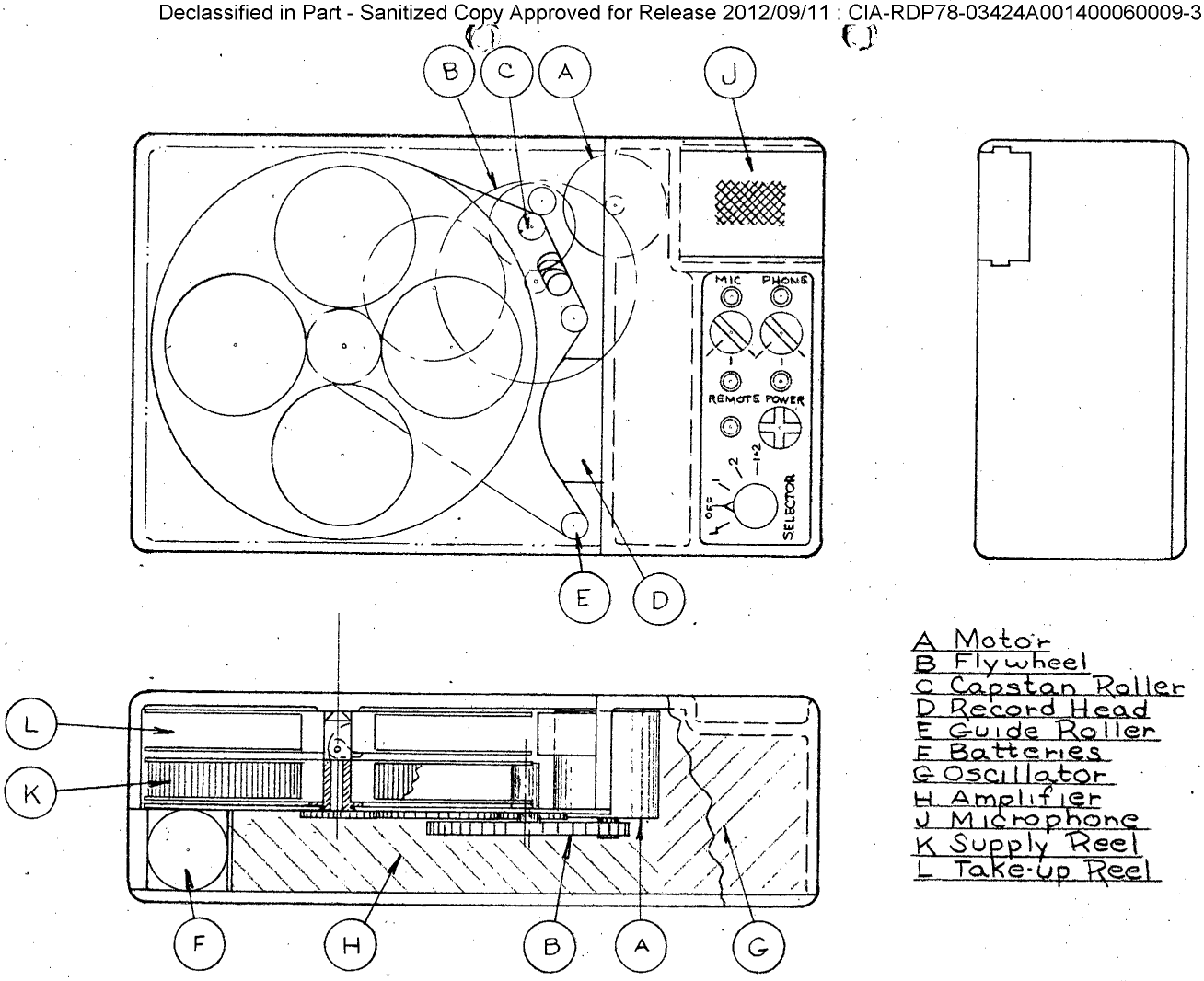
FIG. 1



A- Motor
B- Flywheel
C- Capstan Arm
D- Record Head
E- Guide Roll Assem.
F- Cover Outline
G- Battery Access
H- Amplifier
J- Oscillator
K- Control Panel.
L- Microphone Location

FIGURE 2

CB-3



A Motor
B Flywheel
C Capstan Roller
D Record Head
E Guide Roller
F Batteries
G Oscillator
H Amplifier
J Microphone
K Supply Reel
L Take-up Reel

FIG. 3

CB-3

A - Motor Drive
C - Connecting Drive
D - Record Head
E - Guide Roll
K - Control Panel
L - Microphone
M - Slip Hinge
N - Tape Deck

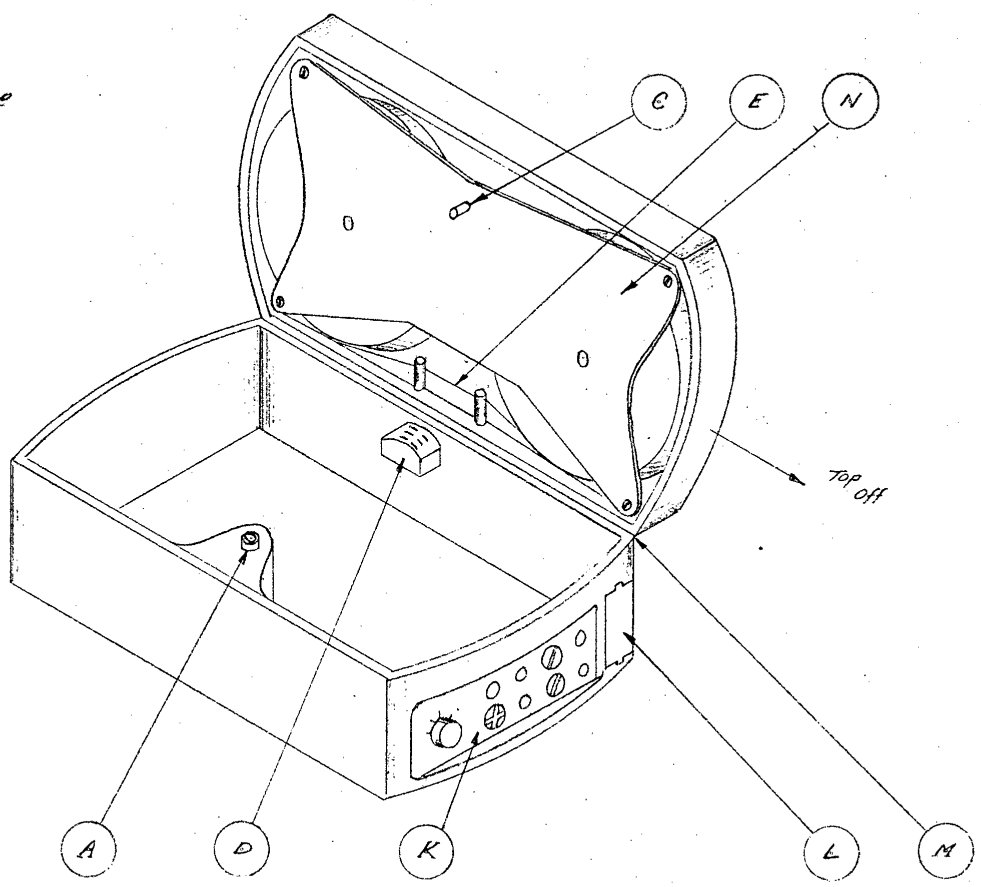


FIGURE 4

CB-3

ITEMIZED COST ANALYSIS

ITEM 1	Phase 1	Breadboard Study Engineering 2500 hrs. Fabrication 600 hrs. Purchases	$ 700.00
	Phase 2	Engineering Model Recorder, with accessories (1) each Engineering 3000 hrs. Fabrication 2000 hrs. Purchases (includes subcontracts)	$ 9,000.00
ITEM 2		Engineering Model, playback unit (1) each Engineering 1200 hrs. Fabrication 1000 hrs. Purchases	$ 2,000.00
ITEM 3		Prototype Model, recorder, with accessories (4) each. Engineering 800 hrs. Fabrication 3200 hrs. Purchases	$ 2,000.00
ITEM 4		Service Test Model, recorder, with accessories (20) each. Engineering 600 hrs. Fabrication 8000 hrs. Purchases	$ 10,000.00
ITEM 5		Service Test Model, Playback Unit (4) each. Engineering 500 hrs. Fabrication 1800 hrs. Purchases	$ 5,000.00
ITEM 6		Kit, accessory, with each recorder (25) sets as per attachment "A" at 125.00/set	$ 3,125.00

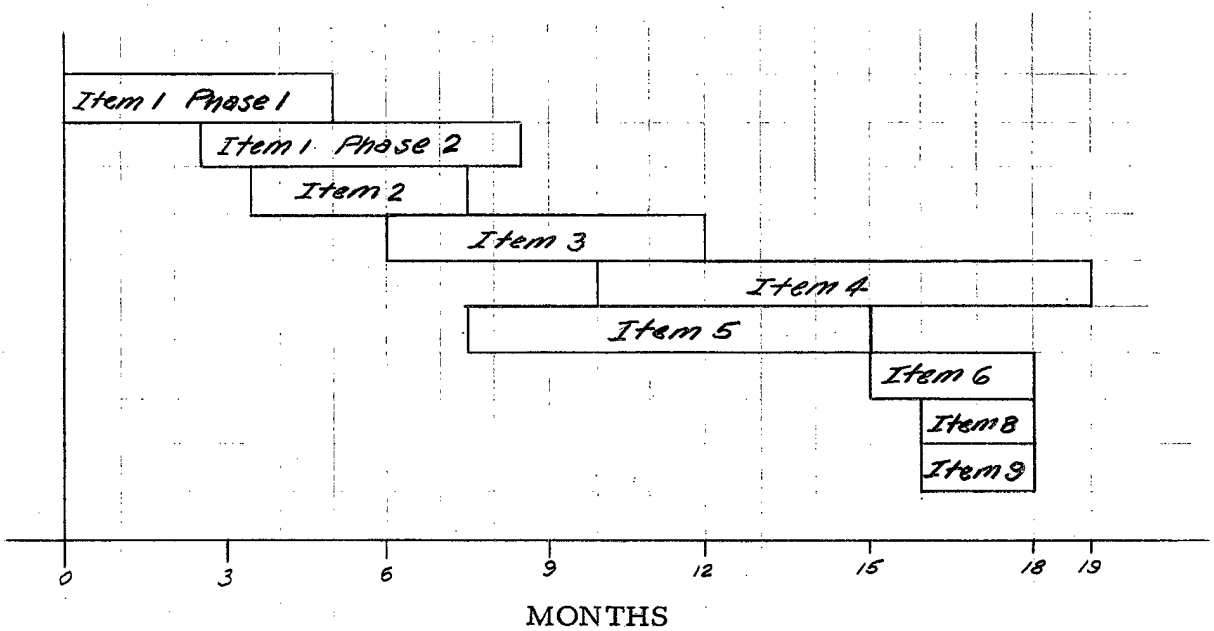
25X1

ITEM 7	Bi-monthly Engineering Progress Reports (5) each.	N/C
ITEM 8	Final Engineering Report (10) each	$ 1,500.00
ITEM 9	Spares, Operating Ket (1) each as per attachment "A" at 3800.00	$ 3,800.00
ITEM 10	List, parts, recorder, playback unit	N/C

SUMMARY

Engineering Total 8600 hrs. at 4.00/hr.		$ 34,400.00
Overhead at 120%		41,280.00
Fabrication Total 16,600 hrs. at 2.75/hr.		45,650.00
Overhead at 160%		73,040.00
Purchases, Total		37,125.00
	Sub Total	$ 231,495.00
G & A at 5.5%		12,732.00
Profit at 6%		13,889.00
	Total	$ 258,116.00

DELIVERY SCHEDULE



DEPARTMENT OF DEFENSE

COST AND PRICE ANALYSIS

NOTE.—If your cost-accounting system does not permit analysis of costs as suggested below, contact the purchasing office for further instructions.

Form approved.
Budget Bureau No. 22-R100.

NAME OF OFFEROR

HOME-OFFICE ADDRESS

PREVIOUS CONTRACT FOR SIMILAR MATERIAL

CONFIDENTIAL 25X1

CONTRACT NO.

QUANTITY

DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED

ACTUAL MANUFACTURING PERIOD (*Exclusive preproduction*) 25X1

FROM	TO

SUPPLIES AND/OR SERVICES TO BE FURNISHED

Engineering, Fabrication and test of Special Recorders and Playback Units.

QUANTITY	AMOUNT OF PROPOSAL	PROCUREMENT DIRECTIVE NO.	PEAK RATE PER MONTH
	$258,116.00		

ITEMS (*Excluding tooling*) [a]	PROPOSED CONTRACT ESTIMATE			PREVIOUS CONTRACT ACTUAL UNIT COST [d] [f]
	PREPRODUCTION	PRODUCTION	TOTAL	
1. DIRECT MATERIAL:				
PURCHASED PARTS [b]	3,200.00	17,000.00	20,200.00	
SUBCONTRACTED ITEMS [b]	8,500.00		8,500.00	
OTHER [c]				
2. ENGINEERING LABOR: at 4.00/hr.				
HOURS PREPRODUCTION: 6700 / PRODUCTION: 1900 / OTHER	26,800.00	7,600.00	34,400.00	
3. ENGINEERING BURDEN 120 % OF 2			41,280.00	
4. DIRECT MANUFACTURING LABOR: at 2.75/hr.				
HOURS PREPRODUCTION: 3600 / PRODUCTION: 13000	9,900.00	35,750.00	45,650.00	
5. MANUFACTURING BURDEN 160 % OF 4			73,040.00	
6. OTHER DIRECT COSTS: [i] Item 6		3,125.00	3,125.00	
7. Item 7 and 10			N/C	
8. Item 8		1,500.00	1,500.00	
9. Item 9		3,800.00	3,800.00	
10. OTHER INDIRECT COSTS: [i]				
11.				
12.				
13.				
14. SUBTOTALS			231,495.00	
15. SELLING EXPENSES				
16. GENERAL AND ADMINISTRATIVE EXPENSES at 5.5%			12,732.00	
17. SUBTOTALS			244,227.00	
18. PROFIT at 6%			13,889.00	
19. ROYALTIES [e]				
20. CONTINGENCIES [g]				
21.				
22. FEDERAL MANUFACTURERS' OR RETAILERS' EXCISE TAX [h]		CONFIDENTIAL		
23. UNIT SELLING PRICE OR TOTAL CONTRACT PRICE EXCLUDING TOOLING [i]				
24. SPECIAL TOOLING COST FROM REVERSE SIDE OF FORM				
25. UNIT SELLING PRICE INCLUDING SPECIAL TOOLING [i]			258,116.00	

DD FORM 1 MAY 53 633 Replaces departmental forms for this purpose which may be used until 30 September 1953. (*See Reverse Side*) 16—69460-1

ANALYSIS OF TOTAL ESTIMATED COST OF SPECIAL TOOLING

COST ELEMENTS	ESTIMATED COST
1. DIRECT MATERIAL:	
PURCHASED PARTS [b]	
SUBCONTRACTED ITEMS [b]	
OTHER [c]	
2. DIRECT MFG. LABOR HOURS	
3. BURDEN % OF 2	
4. DIRECT ENG. LABOR HOURS	
5. BURDEN % OF 4	
6. OTHER FACTORS: [i]	
7.	
8.	
9. TOTAL ESTIMATED COST	
10. AVERAGE COST PER UNIT	

FOOTNOTES

[a] Furnish in space at left separate analysis for total cost of special tooling.

[b] Definitions are shown on DD Form 347 referenced in ASPR paragraph 7-105.7, Bill of Materials. Attach list of principal parts and items indicating source and unit price.

[c] Ordinarily includes (1) basic commodities and raw materials acquired by a contractor in a form or state which requires further processing and (2) other general usage materials which are procured or manufactured for usage in the normal course of contractor's business. Describe method of costing (2).

[d] For research and development and other projects under which it is impracticable to show unit prices, the data should be presented on a total contract price basis.

[e] Furnish patent numbers, names of licensors and rate and basis of royalties.

[f] Exclude any preproduction or other nonrecurring costs. If previous contract is not completed, use best estimate.

[g] Explain fully, attaching list of items and amounts.

[h] Selling price must include any applicable excise tax on finished articles.

[i] Price is F. O. B. ☐ origin or ☐ destination. If the latter, indicate transportation cost $ _____ .

[j] Should include, for example, such things as:

1. "Packaging and Packing," if special to the contract, of significant dollar value, or separately accounted for. As alternate procedure, use a supporting schedule.

2. "Material Handling," if separately accounted for.

1. Is the estimate for direct labor based on wage rates currently prevailing in your plant? ☒ Yes ☐ No (*If not, explain difference on a separate sheet.*)

2. What monthly rate of production is contemplated in calculating your price proposal? _____ units. How many hours of operation required per week? _____

3. If currently producing the same or similar items, what monthly rate of production prevails? _____ units. How many hours of operation required per week? _____

4a. Explain method of computing any depreciation charge included in your proposal.

b. Have you included any charge for fully depreciated facilities or equipment? ☐ Yes ☒ No (*If yes, explain.*)

5. The Company, Corporation, or Firm submitting this analysis represents that: (A) the prices shown on this form do not include any charge for (I) cost of facilities (*including tools, jigs, dies, and other equipment*) which duplicates any charge against any other prior or current Government contract or subcontract; (II) any depreciation on facilities or equipment owned by the Government or any Government agency; (III) any rental or use charge on facilities or equipment owned by the Government, or any Government agency if such facilities or equipment have been provided free of charge;

(B) The prices shown on this form are based on the understanding that the following material, or services, will be furnished by the Government:

(C) It does not require any Government financial assistance;

(D) Bases used in computation of burden rates do not include allowance for overtime compensation;

(E) The bidder (*contractor*) represents: (*a*) that he ☐ has, ☒ has not, employed or retained any company or person (*other than a full-time bona fide employee working solely for the bidder (contractor)*) to solicit or secure this contract and (*b*) that he ☐ has ☒ has not, paid or agreed to pay to any company or person (*other than a full-time bona fide employee working solely for the bidder (contractor)*) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating thereto as requested by the contracting office.

(F) The prices shown do not include any cost of acquisition of facilities.

ANY EXCEPTIONS TO ITEM 5 SHOULD BE FULLY EXPLAINED ON SEPARATE SHEETS.

CERTIFICATION.—*This is to certify that the information contained in this proposal has been based upon or compiled from the books and records of this company and is accurate to the best of my knowledge and belief.*

DATE	FIRM NAME	
5/17/57		25X1
TITLE		
Technical Director		

U. S. GOVERNMENT PRINTING OFFICE 16—69460-1

DEPARTMENT OF DEFENSE

COST AND PRICE ANALYSIS

NOTE.—If your cost-accounting system does not permit analysis of costs as suggested below, contact the purchasing office for further instructions.

Form approved.
Budget Bureau No. 22-R100.

NAME OF OFFEROR

HOME-OFFICE ADDRE

PREVIOUS CONTRACT FOR SIMILAR MATERIAL 25X1

CONTRACT NO.

QUANTITY CONFIDENTIAL

DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED

ACTUAL MANUFACTURING PERIOD (*Exclusive preproduction*) 25X1

FROM | TO

SUPPLIES AND/OR SERVICES TO BE FURNISHED

Engineering, Fabrication and test of Special Recorders and Playback Units.

QUANTITY	AMOUNT OF PROPOSAL	PROCUREMENT DIRECTIVE NO.	PEAK RATE PER MONTH
	$258,116.00		

ITEMS (*Excluding tooling*)	PROPOSED CONTRACT ESTIMATE: PREPRODUCTION	PRODUCTION	TOTAL	PREVIOUS CONTRACT ACTUAL UNIT COST d f
1. DIRECT MATERIAL:				
PURCHASED PARTS b	3,200.00	17,000.00	20,200.00	
SUBCONTRACTED ITEMS b	8,500.00		8,500.00	
OTHER c				
2. ENGINEERING LABOR: at 4.00/hr.				
HOURS PREPRODUCTION: 6700 / PRODUCTION: 1900 / OTHER	26,800.00	7,600.00	34,400.00	
3. ENGINEERING BURDEN 120 % OF 2			41,280.00	
4. DIRECT MANUFACTURING LABOR: at 2.75/hr.				
HOURS PREPRODUCTION: 3600 / PRODUCTION: 13000	9,900.00	35,750.00	45,650.00	
5. MANUFACTURING BURDEN 160 % OF 4			73,040.00	
6. OTHER DIRECT COSTS: i Item 6		3,125.00	3,125.00	
7. Item 7 and 10			N/C	
8. Item 8		1,500.00	1,500.00	
9. Item 9		3,800.00	3,800.00	
10. OTHER INDIRECT COSTS: i				
11.				
12.				
13.				
14. SUBTOTALS			231,495.00	
15. SELLING EXPENSES				
16. GENERAL AND ADMINISTRATIVE EXPENSES at 5.5%			12,732.00	
17. SUBTOTALS			244,227.00	
18. PROFIT at 6%			13,889.00	
19. ROYALTIES e				
20. CONTINGENCIES g				
21.				
22. FEDERAL MANUFACTURERS' OR RETAILERS' EXCISE TAX h				
23. UNIT SELLING PRICE OR TOTAL CONTRACT PRICE EXCLUDING TOOLING i				
24. SPECIAL TOOLING COST FROM REVERSE SIDE OF FORM	CONFIDENTIAL			
25. UNIT SELLING PRICE INCLUDING SPECIAL TOOLING i			258,116.00	

DD FORM 1 MAY 53 633 Replaces departmental forms for this purpose which may be used until 30 September 1953. (*See Reverse Side*) 16—69460-1

ANALYSIS OF TOTAL ESTIMATED COST OF SPECIAL TOOLING

COST ELEMENTS	ESTIMATED COST
1. DIRECT MATERIAL:	
PURCHASED PARTS [b]	
SUBCONTRACTED ITEMS [b]	
OTHER [c]	
2. DIRECT MFG. LABOR HOURS	
3. BURDEN % OF 2	
4. DIRECT ENG. LABOR HOURS	
5. BURDEN % OF 4	
6. OTHER FACTORS: [i]	
7.	
8.	
9. TOTAL ESTIMATED COST	
10. AVERAGE COST PER UNIT	

FOOTNOTES

[a] Furnish in space at left separate analysis for total cost of special tooling.

[b] Definitions are shown on DD Form 347 referenced in ASPR paragraph 7-105.7, Bill of Materials. Attach list of principal parts and items indicating source and unit price.

[c] Ordinarily includes (1) basic commodities and raw materials acquired by a contractor in a form or state which requires further processing and (2) other general usage materials which are procured or manufactured for usage in the normal course of contractor's business. Describe method of costing (2).

[d] For research and development and other projects under which it is impracticable to show unit prices, the data should be presented on a total contract price basis.

[e] Furnish patent numbers, names of licensors and rate and basis of royalties.

[f] Exclude any preproduction or other nonrecurring costs. If previous contract is not completed, use best estimate.

[g] Explain fully, attaching list of items and amounts.

[h] Selling price must include any applicable excise tax on finished articles.

[i] Price is F. O. B. ☐ origin or ☐ destination. If the latter, indicate transportation cost $ _____ .

[j] Should include, for example, such things as:

1. "Packaging and Packing," if special to the contract, of significant dollar value, or separately accounted for. As alternate procedure, use a supporting schedule.

2. "Material Handling," if separately accounted for.

1. Is the estimate for direct labor based on wage rates currently prevailing in your plant? ☒ Yes ☐ No (*If not, explain difference on a separate sheet.*)

2. What monthly rate of production is contemplated in calculating your price proposal? _____ units. How many hours of operation required per week? _____

3. If currently producing the same or similar items, what monthly rate of production prevails? _____ units. How many hours of operation required per week? _____

4*a*. Explain method of computing any depreciation charge included in your proposal.

b. Have you included any charge for fully depreciated facilities or equipment? ☐ Yes ☒ No (*If yes, explain.*)

5. The Company, Corporation, or Firm submitting this analysis represents that: (A) the prices shown on this form do not include any charge for (I) cost of facilities (*including tools, jigs, dies, and other equipment*) which duplicates any charge against any other prior or current Government contract or subcontract; (II) any depreciation on facilities or equipment owned by the Government or any Government agency; (III) any rental or use charge on facilities or equipment owned by the Government, or any Government agency if such facilities or equipment have been provided free of charge;

(B) The prices shown on this form are based on the understanding that the following material, or services, will be furnished by the Government:

(C) It does not require any Government financial assistance;

(D) Bases used in computation of burden rates do not include allowance for overtime compensation;

(E) The bidder (*contractor*) represents: (*a*) that he ☐ has, ☒ has not, employed or retained any company or person (*other than a full-time bona fide employee working solely for the bidder (contractor)*) to solicit or secure this contract and (*b*) that he ☐ has ☒ has not, paid or agreed to pay to any company or person (*other than a full-time bona fide employee working solely for the bidder (contractor)*) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating thereto as requested by the contracting office.

(F) The prices shown do not include any cost of acquisition of facilities.

ANY EXCEPTIONS TO ITEM 5 SHOULD BE FULLY EXPLAINED ON SEPARATE SHEETS.

CERTIFICATION.—*This is to certify that the information contained in this proposal has been based upon or compiled from the books and records of this company and is accurate to the best of my knowledge and belief.*

DATE	FIRM NAME
5/17/57	25X1
TITLE	BY (Si 25X1
Technical Director	

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